



Funded by the Horizon 2020 programme
of the European Union



Open source mapping and planning tools for heating and cooling (networks)

Covenant of Mayors – Investment Forum

Brussels, 19.02.2020



Session overview



(1) Hotmaps (20 min)

(2) THERMOS (20 min)

(3) Q & A (20 min +)



Tools complementarity



Hotmaps

- Default data for EU28 also usable outside the tool
- Very quick first analyses
- Calculation Modules covering entire H&C system

THERMOS

- Address-level demand mapping
- Thermal network route optimisation
- Detailed financial analysis (CAPEX, OPEX, heat sale revenues)



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Section 1

Hotmaps



Hotmaps – What for?

*Hotmaps develops, demonstrates and disseminates **a toolbox to support public authorities, energy agencies and planners in strategic heating and cooling planning** at local, regional and national levels, and in line with EU policies.*



Hotmaps – The 3 pillars

- **User-driven**: developed in close collaboration with 7 European pilot areas
- **Open source**: the developed tool and all related modules will run without requiring any other commercial tool or software. Use of and access to Source Code is subject to Open Source License
- **EU-28 compatible and adaptable**: the tool will be applicable for cities in all 28 EU Member States by default and users can upload their own data

The experts behind the project

Scientific partners



Pilot areas for developing and testing the tool



Bistruta Municipality





Regional overview





Live demonstration

www.hotmaps.eu



Upcoming free trainings

Location	Language	Timing	Duration
<i>Bolzano, IT</i>	<i>EN, (IT, DE)</i>	<i>done</i>	<i>1 ½ days</i>
Brussels, BE	EN	19/20 Feb 2020	1 ½ days
Milton Keynes, GB	EN	1/2 Apr 2020	1 ½ days
Heerlen, NL	EN	22 Apr 2020	½ day
Frankfurt, DE	DE	5/6 May 2020	1 ½ days
Eastern EU	tbd	tbd	1 ½ days

[Further information and registration links can be found here:](https://www.hotmaps-project.eu/become-a-hotmaps-follower/)

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Explore Hotmaps

- Software:
www.hotmaps.eu
- Project:
www.hotmaps-project.eu
- Open Source Data:
<https://gitlab.com/HotMaps>
- Open Source Modules:
<https://github.com/HotMaps>
- Wiki:
<https://wiki.hotmaps.eu>



Questions where Hotmaps can help

- **What is the demand** for heating and cooling in my region and **where is it located**?
- **Which options are available for reducing GHG** emissions from heating and cooling in my region?
- **Which** renewable energy and excess heat **sources could be economically feasible** to use in my region?
- Which **shares of district heating** make sense in my area?
- Which **areas are potentially interesting for district heating**?
- Which **levels of heat savings** could be economically feasible for my region?



THERMOS

Accelerating the development of
low-carbon heating & cooling networks



Paolo M. Sonvilla - Creara & Marta Chillida Munguet - Granollers

Covenant of Mayors Investment Forum
Bruxelles, 19 February 2020



District heating and cooling is now in the core of global climate action



Global action

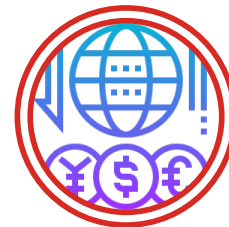


Local Action



District heating is at the heart of sustainable energy transitions

District heating has the potential to cost-effectively provide for at least half of the heating demand by 2050

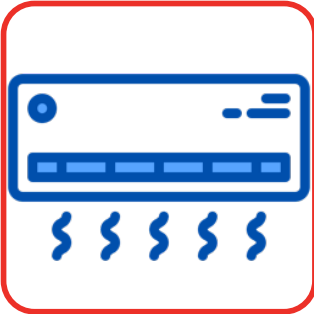


Expansion of thermal grids is crucial to enhance grid flexibility & integrate increasing shares of renewable energy systems

District heating is the most economic and technically viable solution for most urban areas



District cooling: a new energy challenge for cities in a changing climate



The use of energy for space cooling is growing faster than any other end use in buildings, **more than tripling between 1990 and 2016.**



Rising demand for space cooling is already **impacting electricity systems** in many countries, as well as **driving up emissions.**



Problem

Pre-feasibility studies for thermal networks are **expensive**, take **time**, and rely on **uneven approaches**, leading public authorities to face **growing challenges** to effectively manage their energy planning tasks.



Needs of Local Authorities



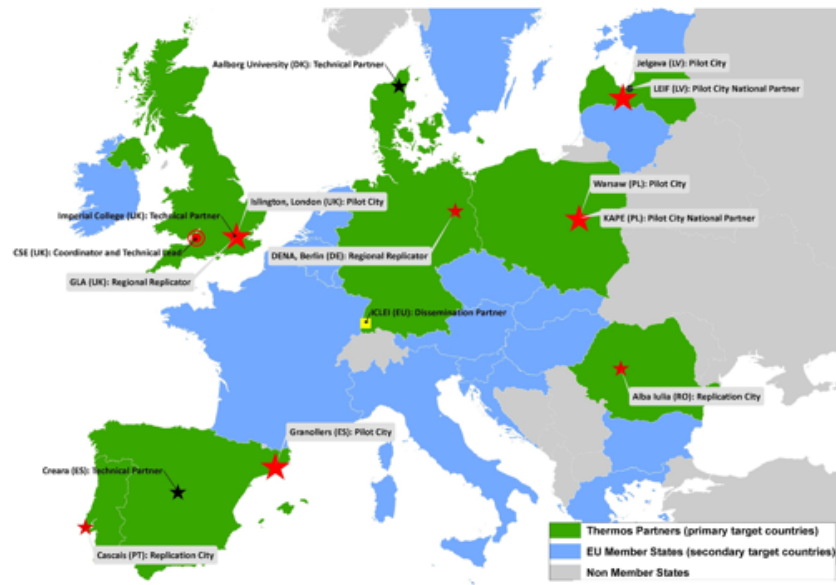
- Consistency in approaches
- Comparability of results
- Information about methodologies used
- Time and cost efficiencies

- **Robust methodologies and tools to rapidly identify, analyse and compare specific thermal energy system option**

- **Building capacity for energy planning is essential to develop strategic local sustainable energy solutions.**



THERMOS Consortium



- Brings together research, consulting and multiplier organisations with local, regional and national authorities - the final users
- Provides for development, validation and exploitation



CASCAIS



MAYOR OF LONDON

Imperial College
London

ISLINGTON



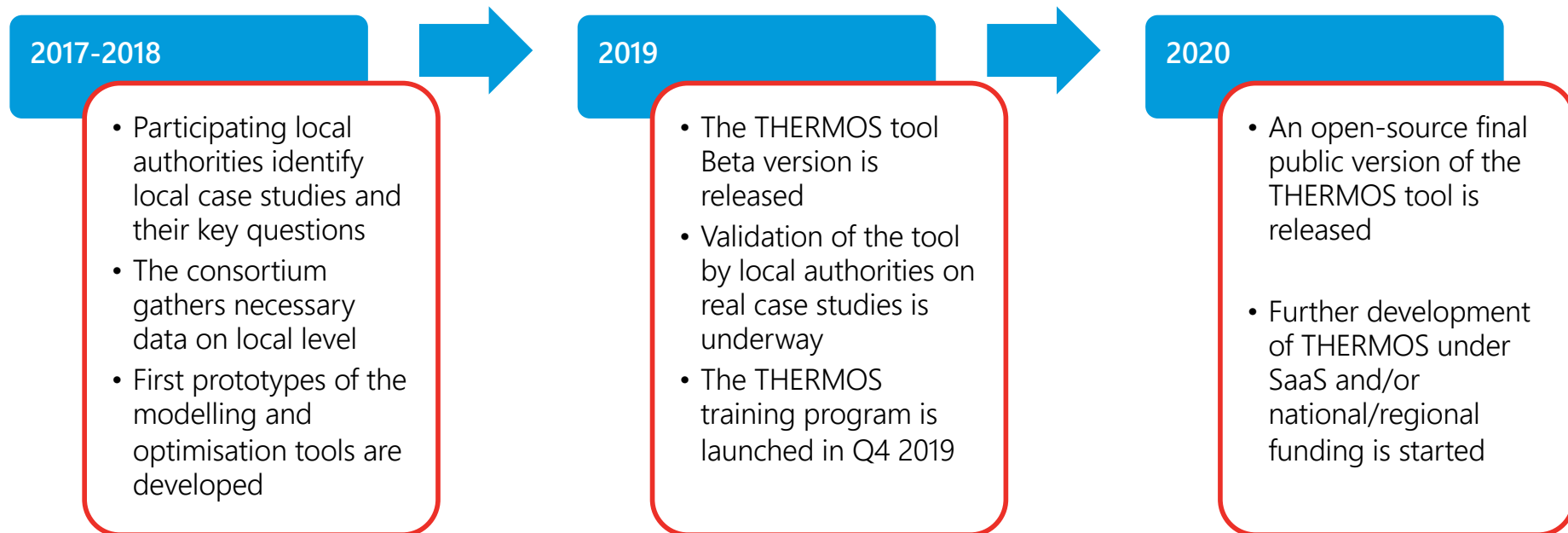
Overall Approach

1. Generalise, implement and share and methods and data for high-resolution **energy system mapping**
2. Develop **thermal energy system models and optimisation procedures** which run on these maps
3. Integrate the maps and the models in an **open-source software application** developed in close collaboration with **pilot local authority users**
4. Support the use of the new tools with **replication partners**
5. **Promote** and **disseminate** our results to maximise post-project **exploitation**





Timeline and Milestones





THERMOS: Thermal Energy Resource Modelling and Optimisation System

An open-source software designed to:



optimise local district energy network planning processes



support sustainable energy master planning



identify and select low-carbon heating options in real geographies



Applicability



THERMOS allows to address early-stage planning of district energy systems, reducing the time and efforts needed to identify concrete opportunities before starting the design phase



THERMOS addresses four main thermal planning use cases



1

Expansion of existing district heating and cooling networks

2

Planning a new network given a known energy source

3

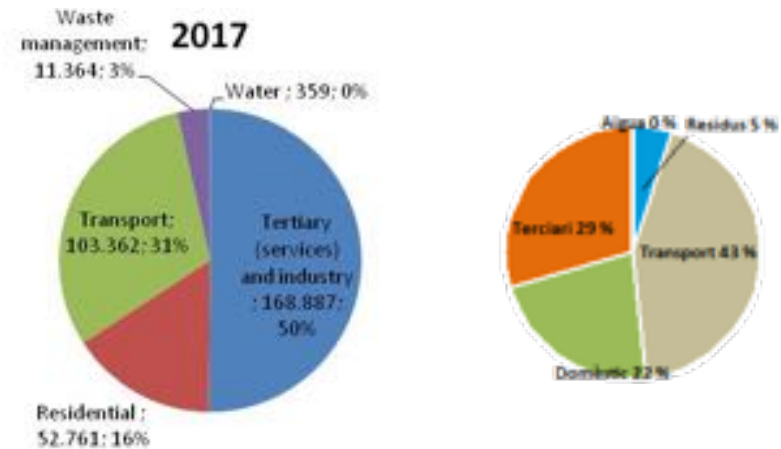
Planning a new network serving a given local thermal demand utilising one or more energy sources

4

Identifying optimised solutions when considering energy efficiency measures, thermal networks and/or individual H&C measures

Granollers - Key information

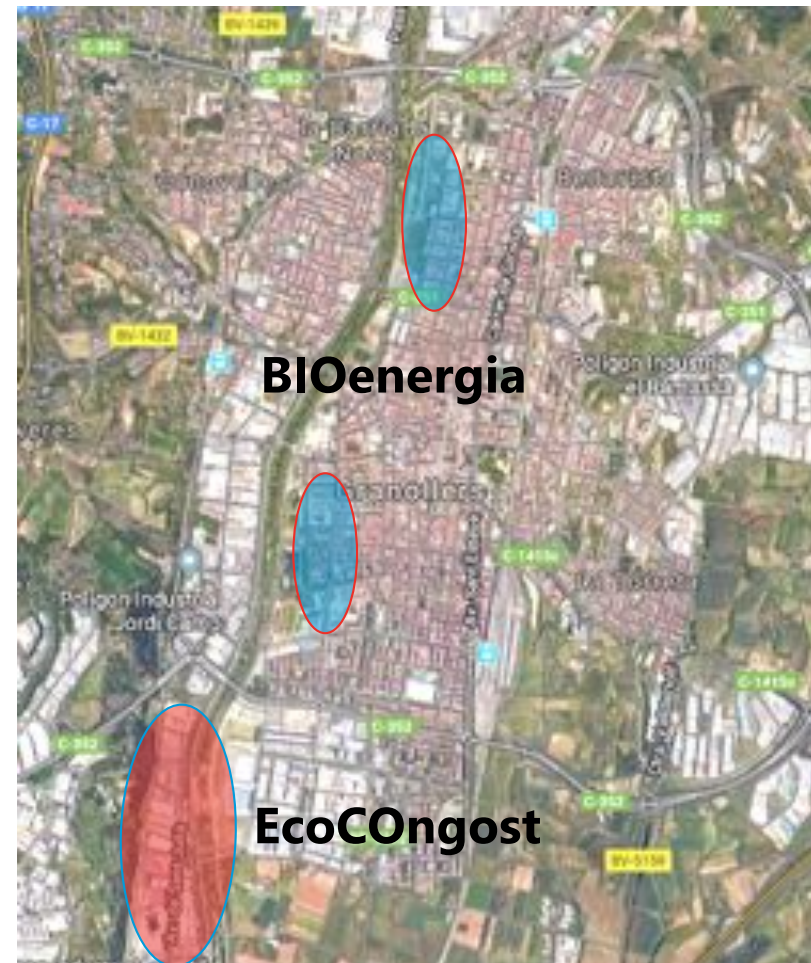
- The industrial sector is the main GHG emission source in the city
- Since 2008, Granollers in involved in the CoM and has developed several planning initiatives





THERMOS Case Studies

- **THERMOS helps Granollers** to meet the local thermal planning objectives:
 - **Better estimation** of thermal energy demand for industrial and residential sectors
 - Evaluation of **different alternatives** for local decision makers
- The **SEAP** approved in 2009 already features the industrial area **EcoCongost project** as a key project to produce and use heat with local renewables
- **Study of urban area users** for the **BIOenergia thermal networks** to be completed in 2020-2021





Case study - Ecocongost

Ecocongost - Key objectives

- **Energy supply options:**
 - **Biogas from organic waste digestion** available up to 12 million m³/year.
 - **Sewage sludge** energy recovery up to 2.4 GWh/year
 - **Biomass: local forest biomass** available 18.000 Tn/year. Energy production: 63 GWh/year
 - **Natural gas:** To reach peak demand: 22.5 GWh/year (can be reduced with more biogas production)
- **9 industrial buildings** with steam demand for industrial processes
- **Total demand** to be satisfied: 102.5 GWht/year
- **Project calendar** not defined yet



Case study - BIOenergia

BIOenergia - Key objectives

- Energy supply:
 - **Local biomass**
- **5 + 7 buildings**, mainly schools and other public facilities
- **Total demand:**
 - 611 MWh/year (North branch)
 - 705 MWh/year (South branch)
- **Financing:** 50% European ERDF funds and 50% municipality budget
- **Project calendar** in progress, estimated completion:
 - North branch - early 2020
 - South branch - 2021







Benefits of using THERMOS for energy planners



Integrating local (low-carbon) energy sources to their local thermal networks

Better network design on a prefeasibility stage



To meet local sustainability goals, such as energy, GHG emissions and air pollution reduction goals



To reduce energy costs and promote energy efficiency



To foster innovation and collaboration among public and private sector



THERMOS Online Training

Step 1

Get introduced: 3 recorded Webinars on:

- Energy system mapping & modelling
- Embedding THERMOS in your city
- Optimising thermal planning

**Kick off
March 2020!**

Step 2

Get started: 3 guided exercises & support videos on:

- starting your project with THERMOS
- optimising planning decisions
- modifying demand & network paths

Benefit from free THERMOS supporting material on energy system demand & supply and innovative financing models

Step 3

Be a Pro: develop and advance your own case study with support from THERMOS partners (optional)

Obtain a Training Certificate at the end!



Additional Information

- THERMOS website: www.thermos-project.eu
- THERMOS tool demonstration video: www.youtube.com/watch?v=r14L63Bf2t0
- THERMOS training material: <https://www.thermos-project.eu/get-involved/training/>
- Try out the THERMOS tool: <https://v5.thermos-project.eu> (email registration needed)

All you need is a standard web browser and an internet connection!



Thank you!



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Granollers

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